REMARKS

The claims are claims 1, 3, 5, 6, 8 and 10.

Claim 10 is amended to depend upon apparatus claim 6 rather than method claim 1.

Claims 1, 3 and 5 were rejected under 35 U.S.C. 101 as non-statutory subject matter. The OFFICE ACTION states that the claims "simply recite an abstract idea for converting digital audio signal."

Claim 1 recites statutory subject matter. Claim 1 now recites "receiving input digital audio data having a first time scale" and "converting the output digital audio signal into sound having a second time scale according to the desired time scale modification." This claim thus recites conversion of a thing (the input digital audio data having a first time scale) into a different thing (sound having a second time scale). The utility of this conversion is noted in the application at page 2, lines 2 to 7 which state:

> "Time-scale modification (TSM) is an emerging topic in audio digital signal processing due to the advance of low-cost, high-speed hardware that enables real-time processing by portable devices. Possible applications include intelligible sound in fast-forward play, real-time music manipulation, foreign language training, etc."

Provision of intelligible sound in fast-forward play is a useful, concrete and tangible result. Note that as currently presented claim 1 recites producing sound corresponding to a digital input signal with a second time scale.

The OFFICE ACTION of June 10, 2010 states at page 3, line 18 to page 3, line 7:

> "Claims 1, 3, and 5 are rejected under 35 USC 101 as not

> falling within one of the four statutory categories of invention. While the claims recite a series of steps to be performed, a statutory process under 35 USC 101 must be tied to another statutory category (such as a manufacture or a machine) or transform underlying subject matter (such as an article or material) to a different state or thing. The steps in those claims can be performed manually without the use of a particular machine. Those claims could be done in a piece of paper, by using digital signal processing (DSP) theory to derive all the values recited in the claims. Thus, claims 1, 3, and 5 do not define a statutory process."

The Examiner states that "claims 1, 3, and 5 are each taken as a whole, the claims are directed to the preemption of an abstract idea, and thus are non-statutory." The later specifics ignore the portions the amendment filed October 2, 2009 pointed out (page 6, lines 9 to 26) as indicative of statutory subject matter. The Examiner thus does consider the claims as a whole. Claim 1 as amended recites "converting the digital audio signal into sound." The OFFICE ACTION fails to state how producing a sound can be performed "in a piece of paper, by using digital signal processing (DSP) theory." The Applicants submit that this step cannot be performed on paper. As a whole independent claim 1 recites a method of producing sound. Producing sound is a concrete and tangible result. The above quoted portion of the application teaches this is useful. Thus claim 1 recites statutory subject matter. Accordingly, claims 1, 3 and 5 are statutory subject matter.

Claims 1, 3, 5, 6, 8 and 10 were rejected under 35 U.S.C. 103(a) as made obvious by the combination of Laroche et al "Improved Phase Vocoder Time-Scale modification of Audio," IEEE TRANSACTIONS ON SPEECH AND AUDIO PROCESSING, Vol. 7, No. 3, May 1999, Laroche U.S. Patent No. 6,766,300 and Dolson U.S. Patent No. 6,112,169.

Claims 1 and 6 recite subject matter not made obvious by the combination of Laroche et al, Laroche and Dolson. Claims 1 and 6

recite calculating "a phase difference for each of a predetermined number of spectral lines near the dominant spectral line within each spectral band as the phase difference of the corresponding dominant spectral line" and calculating "a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm." This recitation of claims 1 and 6 requires different treatment of different spectral lines within each spectral band. For a predetermined number of spectral lines near the dominant spectral line the calculated phase difference corresponds to the phase difference of the dominant spectral line. For other spectral lines the phase difference is calculated by the phase vocoder algorithm. The OFFICE ACTION states at page 5, lines 19 to 21 that neither Laroche et al nor Laroche teach calculating "a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm." The OFFICE ACTION cites Dolson at column 5, lines 50 to 60 as teaching this subject matter. This portion of Dolson states:

> "At step 212, signal processing system 100 computes the remaining phase values in each contiguous frequency regions. These are determined so as to preserve the original relationship between phase values, despite the change in the phase value of the significant peak. In one embodiment, the phase values are simply shifted by adding or subtracting the same number that was added to or subtracted from the phase value for the significant peak. This preserves the linear differences among the phases. FIG. 6 shows the phase values additively shifted to match the change in phase value for the perceptually significant peak."

This differs from the recitations of claims 1 and 6 is two aspects. Firstly, this portion of Dolson fails to teach the recited phase vocoder algorithm. The technique taught in this portion of Dolson corresponds to the "rigid phase locking" taught in the present application at page 9, line 17 to 20. The key phrases in Dolson are "adding or subtracting the same number" used for the dominate

peak to preserve "the linear differences among the phases." Thus this is not the claimed phase vocoder algorithm as recited in claims 1 and 6. Secondly, this portion of Dolson applies the same phase calculation type to all the non significant peaks. Thus Dolson is similar to the combination of Laroche et al and Laroche in applying a single phase calculation type to all peaks though Dolson teaches a different single type calculation. In contrast, claims 1 and 6 perform different type phase calculation for differing sets of peaks. Because Dolson performs a different type phase calculation than claimed and provides no teaching of using differing type phase calculations for differing sets of non-dominant peaks, Dolson does not make obvious these limitations of claims 1 and 6. Accordingly, claims 1 and 6 are allowable over the combination of Laroche et al, Laroche and Dolson.

Claims 3 and 8 recite subject matter not made obvious by the combination of Laroche et al, Laroche and Dolson. Claims 3 and 8 recite merging "nearby spectral lines that are within a predetermined frequency range of each other prior to calculating the phase difference." The OFFICE ACTION cites Dolson at column 3, lines 27 to 30 as making obvious this limitation. Dolson at column 3, lines 21 to 31 (including the portion cited by the Examiner) states:

> "In accordance with a first embodiment of the present invention, a method for preserving a natural sound of a sound signal after signal processing, including steps of registering a sequence of DFT representations that represent the sound signal, identifying significant peaks in DFT representations of the sequence, partitioning at least one DFT representation of the sequence into a set of contiguous frequency regions, such that each contiguous frequency region includes a single significant peak identified in the identifying step, computing a desired phase modification for a particular significant peak"

This disclosure of Dolson fails to make obvious the recited

"merging nearby spectral lines." This portion of Dolson teaches dividing the DFT representation into contiguous frequency regions. These frequency regions will have a single significant peak. Dolson then teaches computing a phase modification for each of these significant peaks. Thus this disclosure of Dolson teaches separating these significant into differing frequency regions prior to calculating the phase modification. Dolson teaches no peaks other than these significant peaks. Separation of significant peaks into differing frequency regions is the opposite of the recited "merging." Dolson further fails to teach the recited merged peaks are "within a predetermined frequency range of each other." Accordingly, claims 3 and 8 are not made obvious by the combination of Laroche et al, Laroche and Dolson.

Claims 5 and 10 recite subject matter not made obvious by the combination of Laroche et al, Laroche and Dolson. Claims 5 and 10 recite partitioning "the spectrum into a plurality of contiguous spectral bands according to a Bark scale by adjusting boundaries of spectral bands to maintain important frequency groups within the same spectral band." The OFFICE ACTION cites Dolson at column 5, lines 20 to 24 which state:

> "The borders between contiguous frequency regions may be selected in a number of ways. In one embodiment, the channel midway between two significant peaks becomes the border between the corresponding contiguous frequency regions."

The Examiner fails to explain how setting the border between contiguous frequency regions midway between two significant peaks maintains "important frequency groups within the same spectral band." The Applicants submit this teaching of Dolson separates significant peaks into differing frequency regions. This is an opposite process to the claimed maintaining "important frequency groups within the same spectral band." Accordingly, claims 5 and 0

are not made obvious by the combination of Laroche et al, Laroche and Dolson.

The Applicants respectfully submit that all the present claims are allowable for the reasons set forth above. Therefore early entry of this amendment, reconsideration and advance to issue are respectfully requested.

If the Examiner has any questions or other correspondence regarding this application, Applicants request that the Examiner contact Applicants' attorney at the below listed telephone number and address to facilitate prosecution.

Texas Instruments Incorporated
P.O. Box 655474 M/S 3999
Dallas, Texas 75265
(972) 917-5290
Fax: (972) 917-4418

Respectfully submitted,

/Robert D. Marshall, Jr./
Robert D. Marshall, Jr.
Reg. No. 28,527